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From Face-to Face to Interface: A Mixed-Methods Study of Media and Technology's Role in Nonverbal Communication

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Abstract

The rapid expansion of media and technology has significantly reshaped nonverbal communication. Nonverbal communication, which includes cues such as facial expressions, gestures, posture, and tone of voice, is central to human interaction and plays an important part in conveying emotions and social meaning. However, the rise of digital communication and social media platforms has altered these dynamics, with individuals increasingly relying on written text and emoticons to convey messages. The aim of this study is to investigate how the use of media and technology affects the use of nonverbal cues within the broader framework of Computer Mediated Communication (CMC). Twenty Libyan English postgraduate students from the Faculty of Languages at the University of Benghazi participated in this study. A mixed-method design combining survey data and semi structured interviews was employed to collect and analyse evidence. Findings revealed that whilst students continue to value traditional nonverbal communication in face-to-face contexts, they increasingly practice communicative choices that allow them to adapt to digital substitutes such as emojis, memes, GIFs, and textual markers, reflecting both a transformation and a partial loss in nuance in nonverbal expression.

Keywords

verbal communication, nonverbal communication, CMC

من التواصل المباشر إلى التفاعل عبر الإنترنت: دراسة متعددة المناهج حول دور الإعلام والتكنولوجيا في التواصل غير اللفظي.

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الملخّص

تُعدّ التوسّعات السريعة في وسائل الإعلام والتكنولوجيا قد غيّرت بشكل كبير من التواصل غير اللفظي. يشمل التواصل غير اللفظي إشارات مثل تعبيرات الوجه، والإيماءات، ووضع الجسم، ونبرة الصوت، وهو عنصر أساسي في التفاعل البشري ويلعب دورًا مهمًا في نقل المشاعر والمعاني الاجتماعية. ومع ذلك، فقد غيّرت الزيادة في التواصل الرقمي ومنصات وسائل التواصل الاجتماعي هذه الديناميكيات، حيث أصبح الأفراد يعتمدون بشكل متزايد على النصوص المكتوبة والإيموجي لنقل الرسائل. تهدف هذه الدراسة إلى استقصاء كيفية تأثير استخدام وسائل الإعلام والتكنولوجيا على استخدام الإشارات غير اللفظية في إطار أوسع من التواصل المدعوم بالحاسوب .(CMC) شارك في هذه الدراسة عشرون طالبًا دراسات عُليا في اللغة الإنجليزية من كلية اللغات بجامعة بنغازي. تم استخدام تصميم مختلط يجمع بين بيانات الاستطلاع والمقابلات شبه المنظمة لجمع وتحليل الأدلة. كشفت النتائج أنه على الرغم من أن الطلاب لا يزالون يقدّرون التواصل غير اللفظي التقليدي في السياقات المباشرة، إلا أنهم يمارسون بشكل متزايد اختيارات تواصلية تمكّنهم من التكيّف مع البدائل الرقمية مثل الإيموجي، والميمات، وGIFs، وعلامات النص، مما يعكس تحولًا وفقدانًا جزئيًا في الفروق الدقيقة في التعبير غير اللفظي.

الكلمات المفتاحية:

التواصل اللفظي، التواصل غير اللفظي، التواصل الوسيط بالحاسوب(*CMC*)

1. Introduction

Donald Sessions once asserted, "Connection even for a brief moment produces the powerful enchantment of presence," (Baumgardner, 2017). Communication - both verbal and nonverbal – enables such connections by allowing individuals to share meaning and sustain relationships. According to Kumari & Ganagwar (2018), humans maintain contact through diverse communicative processes while Burgoon & Bacue (2003) emphasise that nonverbal ability is a core component of social competence.

Within interpersonal interaction, nonverbal communication is particularly crucial. Sometimes referred to as "silent language," it encompasses all means of communication other than speech, such as body language, gestures, posture, and even clothing. All these elements have the potential to communicate signals, whether consciously or unconsciously (Montepare, 2014). Depending on context, these signals can be powerful, shaping

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interpretation and emotional resonance. Matsumoto et al. (2013) argue that any communication act would be incomplete without nonverbal elements underscoring their indispensability.

Scholars further highlight the breath of nonverbal communication. Wajahat (2024:1) regards it as "a fundamental aspect of human interaction that complements and sometimes supersedes verbal communication". On the other hand, Valentini et al. (2019) expose the complexity of nonverbal communication identifying paralanguage, kinesics, proxemics, and haptics as its four primary components with chronemics and vestemics offering additional dimensions. A brief definition of each term is necessary here in order to clarify any conceptual ambiguity.

- Paralanguage, is the vocalized but not verbal part of a spoken message, such as speaking rate, volume, and pitch.
- Proxemics is the study of personal space and t he physical distance between individuals durin g interactions. It examines how space is used i n communication and how it varies across diff erent cultures.
- Kinesics refers to the study of body movement s, gestures, facial expressions, posture as forms of nonverbal communication.
- Haptics is the study of communication throug h touch. It explores how touch can convey me ssages and emotions, and the social rules gove rning touch in different contexts.

Collectively, these elements enable individuals to express emotions, intentions, and attitudes without words. Facial expressions, for instance can signal joy, grief, surprise, or anger (Ventrella, 2011), while gestures and body language communicate support, authority, or resistance.

Additionally, gestures can be used to express support or displeasure but also to instruct others to carry out certain tasks. Similar to facial expressions, body language may also give away a person's mood, including how they stand and move, how close or far they are to someone else, and how they make eye contact.

Nonverbal cues can also convey relational meanings such as, trustworthiness, openness, or the desire for privacy (Montepare, 2014). They can also signal agreement or disagreement status, authority or lack thereof, as well as complex power dynamics (Wahyuni, 2018).

Importantly, the effectiveness of nonverbal communication can be enhanced when combined with vocal communication. For instance, gestures and facial expressions can enphasise sympathy or agreement while touch may express empathy, comfort or reassurance in specific contexts.

2. Research Aims

This study pursues the following aims:

1. To investigate the relationship between media and technology use and individuals' sensitivity to nonverbal cues in interpersonal communication.
2. To explore how emotional expression differs between digital and traditional communication formats and how these differences shape interpersonal relationships.

3. Research Questions

In line with these aims, the study addresses two interrelated questions:

1. In what ways does the use of media and technology affect individuals' sensitivity to nonverbal cues during face-to-face interactions?
2. How do individuals perceive and express emotions differently in digital communication compared to traditional face-to-face interactions?

While traditional scholarship has established the centrality of nonverbal communication in interpersonal interaction, contemporary developments in media and technology have introduced new challenges and opportunities. The proliferation of computer-mediated communication (CMC) platforms such as social media, instant messaging, and video conferencing, has altered the manner in which nonverbal cues are expressed, interpreted, and sometimes replaced by digital substitutes like textual markers, emojis, or GIFs. These shifts raise critical questions about whether nonverbal communication retains its richness and nuance in technologically mediated contexts, or whether its transformation diminishes its effectiveness. Addressing this gap, the present study explores how media and technology influence the use and perception of nonverbal communication drawing on empirical evidence from Libyan postgraduate students to provide insights into the evolving dynamics of human interaction in the digital age.

4. Literature Review

Effective communication relies heavily on nonverbal cues, which are a fundamental aspect of any interaction. They are a crucial tool for relational development, intentional meaning-making, and emotional expression. Matsumoto et

al. (2013,4) define nonverbal communication as " the transfer and exchange of messages in any and all modalities that do not involve words." In order to use nonverbal communication effectively in any circumstance, it is crucial to be aware of how it is perceived by others.

4.1. Contribution of Nonverbal Cues.

Communication extends beyond spoken words to include tone, gestures, and other nonverbal signals (Eaves & Leathers, 2017). Nonverbal cues often precede language development and remain central to interpersonal meaning (Burgoon et al., 1994). Facial expressions, gestures, posture, eye contact, voice inflection, touch, proximity, together with appearance all convey attitudes, moods, and emotions (Lawrence, 2017. Therefore, it is not only the words individuals use, but also the way they say them and the nonverbal cues they give off, whether they are aware of them or not. As a matter of fact, what happens when communicating, whether consciously or unconsciously, is also considered to be a part of communication. People frequently fail to comprehend what happened throughout a conversation that led one person to feel the way they do. Most importantly, therefore, the interpretation of these cues varies across contexts and cultures, underscoring their complexity. The way someone speaks has an impact on their life, whether in their workplace, friendships, and interpersonal connections. Accordingly, recent studies confirm that nonverbal sensitivity remains a critical predictor of social competence, even in digitally mediated environments (Ismail et al., 2024)

Wilson (1979, as cited in Mandal, 2014:417) proposed the following definition of communication: “whenever the behavior of one individual (the sender) influences the behavior of another individual (the receiver)." On the other hand, Gabor et al. (2015) believe that when it comes to communication, 7% is verbal (spoken words), 38% is vocal (the tone and pitch of voice), and 55% is nonverbal information.

Nonverbal cues are among the main forms of communication that humans employ. In fact, Burgoon et al. (1994) claim that language was preceded by nonverbal communication. Facial expressions such as smiles, frowns, raised eyebrows, squinting, and others can represent a variety of attitudes and feelings (Matsumoto and Hwang, 2019). According to Eaves and Leathers (2017), the nonverbal cues often work effectively to support people to achieve their conversational objectives.

In addition, gestures, hand gestures, such as waving, pointing, and giving the thumbs-up, can express meaning and emphasize meaning (Harrison, 1973). In relation to body language, a person's standing or sitting posture might convey confidence, focus, or relaxation. Similarly, maintaining eye contact while speaking can demonstrate interest, focus, and reliability. Voice inflection allows individuals to express emotions and attitudes through their speech, including their volume, pitch, and tone. Besides, touch can also play an important role in communication: physical touch, such as a handshake or a pat on the back, can communicate warmth, support, or congratulations. Furthermore, proximity - that is the distance between people - can communicate intimacy, dominance, or aggression. In addition to these elements, several aspects related to appearance such as clothing, hairstyle, may point to social status, personality, and cultural identity (Lawrence, 2017).

4.2. Universal Cultural Nonverbal Cues

Nonverbal behaviours are deeply influenced by culture Matsumoto (2006). In the age of technology and digital media, communication between people from different cultures has become familiar. However, communicating with people from other cultures can be quite complicated, especially with regard to nonverbal cues. In this respect, Tanenbaum et al. (2014) argue that intercultural communication includes both cross-cultural communication and communication within a single culture. Misinterpretation of nonverbal signs is a common challenge in intercultural communication (Samman et al., 2009). Recent evidence shows that cultural diversity continues to complicate decoding of nonverbal behaviour in globalized workplaces, particularly in virtual settings (Adair et al., 2024).

According to Matsumoto (2000), there are a number of concerns that can occur when individuals from different cultures communicate. First, people might think that cultures are somehow identical and that communication would not be affected. Second, some minor cultural linguistic differences may go overlooked by people during communication. Nonverbal clues constitute the third difficulty in cross-cultural communication. Since language is not entirely verbal in nature, some nonverbal cues may be interpreted

incorrectly in unfamiliar cultural settings. Finally, a person may occasionally feel uncomfortable and anxious while communicating with others from various cultures, which may hinder communication.

Twenty employees from a Chinese company participated in a questionnaire that was carried out in 2014 by Gut et al. (2017). The purpose of the questionnaire was to evaluate cultural, stereotypical, and communicative variations. Although the participants exhibited unfavorable attitudes against communications that were culturally biased, they had positive opinions toward cross-cultural relationships. In addition, although all participants agreed that culture is essential to everyone, they also acknowledged that cultural diversity has had a negative impact on their lives. The interactions between the various cultures frequently result in a loss of communication, which is essential.

According to research based on speech rate (Cesario & Higgins, 2008), nonverbal cues are independent of the context of the communication. Higher pitch and faster speech rates increase the effectiveness of the message and increase the credibility of the source, while primary emotions are expressed facially. Matsumoto and Hwang (2019) argue that emotional facial expressions are universal. Subsequently, people of different cultures can recognize basic emotions like happiness, sadness, anger, fear, surprise, and contempt from facial expressions. Moreover, people from diverse cultures can interpret bodily positions, including standing straight or slouching, as expressing dominance and submission.

According to research, head swaying and nodding are universal; all civilizations are familiar with the nodding and shaking of the head as signs of agreement and disapproval. Touch, a handshake or a hug, for example, can bridge cultural boundaries to convey warmth and goodwill. Nevertheless, while studies have shown that eye contact is typically regarded as an indicator of concentration and involvement, the amount of eye contact that is considered appropriate can differ among cultures (Abercrombie, 1972).

It is important to remember that the meanings of nonverbal cues can still vary among cultures, and there may be additional nonverbal indications that are specific to certain cultural contexts. Nonetheless, the universality of some nonverbal cues was taken to indicate that some nonverbal communication abilities are physiologically predetermined and intrinsic (Woolfolk,1979).

4.3 Theoretical Framework

Three established CMC theories are relevant to this study. These three complementary theoretical perspectives on computer-mediated communication (CMC), when considered together, account for both the constraints digital channels impose on nonverbal expression and the adaptive strategies users develop in response.

Firstly, according to Media Richness Theory (Daft & Lengel, 1986) communication channels are different in their capacity to convey information, "richness" being determined by multiple cues, immediacy of feedback, language variety, as well as personal focus. Face-to-face interaction naturally occupies the richest end of the continuum because it conveys the full range of visual, vocal, and proxemic cues at the same time. Text-based channels (such as SMS, instant messaging, email) sit at the opposite end, where most nonverbal information is sifted out. In between, video conferencing can be found, as it preserves facial and vocal cues but proxemics, haptics, and peripheral body language. The theory holds that users will experience greater ambiguity and misinterpretation when leaner channels are used for tasks that demand socio-emotional content.

The Cues-Filtered-Out theory (Culnan & Markus, 1987; Kiesler, Siegel, & McGuire, 1984) expands this stance, arguing that the absence of nonverbal cues in text-based CMC operates a depersonalization on interaction increasing the likelihood of misunderstanding, conflict, and reduced socio-emotional nuance. From this perspective, digital substitutes such as emojis or GIFs can compensate only partially, since they cannot fully reproduce the spontaneity of embodied nonverbal expression.

Walther's (1992) Social Information Processing Theory (SIP) offers a more optimistic argument. SIP claims that CMC users do not simply lose nonverbal information; they actually re-encode it into the cues that the channel does support, such as wording, punctuation, timing, message length, but also emojis and GIFs (Walther, 2011; Walther & Parks, 2023). Given sufficient time, users develop relational and emotional richness in text-based environments comparable to that achieved face-to-face. Walther's (1996) later Hyperpersonal Model goes even further, arguing that selective self-

presentation in CMC can at times match and even overperform the affective intensity of face-to-face encounters.

Taken together, these three perspectives generate two contrasting predictions for the present study. Whilst the cues-filtered-out view predicts that Libyan postgraduates will report frequent misunderstanding and reduced sensitivity to nonverbal cues when communicating digitally, SIP anticipates that they will report developing compensatory strategies, including emojis, voice notes, explicit verbal qualifiers, and channel-switching, that partially restore emotional nuance. The present study examines whether one or both of these patterns is observable in this population, and how cultural context modulates the picture.

4.4 Media and Technology Evolution

The rise of computer-mediated communication (CMC) has increasingly restricted the visibility of nonverbal cues, often leading to misunderstandings (Mc Kenna & Bargh, 2000). Text-based platforms tend to lack paralinguistics richness, though emojis and GIFs have emerged as effective substitutes for emotional expression (Chiang& Gomez-Zara, 2024).

One of the ways that media and technology impact nonverbal communication is through the usage of digital communication platforms. People tend to communicate more and more through text-based channels. Due to the growing use of social media, email, and messaging apps, the individuals' capacity to convey nonverbal cues is restricted. In computer-mediated communication (CMC), a lack of visibility implies that nonverbal clues are not present. This lack of nonverbal communication suggests that certain information will not be fully communicated during an engagement (McKenna & Bargh, 2000). For instance, it is difficult to convey tone and emotion through text, which can lead to misunderstandings and misinterpretations (Derks et al., 2023; Walther et al., 2023).

Nonverbal cues serve a variety of social functions. One purpose is that it reduces the ambiguity of the intended emotion presented. For instance, the meaning of a message may change depending on whether it is accompanied by a smile or a frown. For instance, when e-mail initially gained popularity, messages were frequently misunderstood because they lacked the non-verbal cues that usually excite and explain live conversations (Sanderson, 1993, as cited in Amaghlobeli, 2012), especially when the writer was trying to be humorous.

Technology and media have also had additional effects on nonverbal communication. Specifically, filters, digital enhancements, and virtual reality environments further reshape the way nonverbal signals are perceived, sometimes distorting authenticity. Indeed, the usage of such tools and digital upgrades on social media sites can change how people perceive how people look and the nonverbal indications that are expressed through body language and facial expressions. The use of virtual reality technology can also produce a simulated environment that can affect nonverbal communication because people may respond differently in a virtual environment than they would in a real-world one.

Throughout this study, "digital substitutes" refers to the symbolic resources users employ within text-based CMC to compensate for the absence of embodied nonverbal cues. These include graphic substitutes such as emojis, emoticons, GIFs, stickers, memes, typographic substitutes, namely capitalization, repeated letters, punctuation, ellipses, and structural substitutes like message length, response latency, voice notes, explicit verbal qualifiers such as "just kidding".

4.5 Media and Technology's Effects on Nonverbal Communication

In today's digital world, it can be argued that both media and technology have equally positive and negative impact on nonverbal communication. For example, Valentini et al. (2019) believe that although communication has become simpler, quicker, and more instantaneous thanks to digital media, face-to-face conversation's paralinguistic components are absent from computer-mediated communication. Heavy social media use is linked to reduced sensitivity to nonverbal cues and altered perceptions of emotional expression (Wajahat, 2024). Recent findings suggest that younger users, in particular, experience a decline in empathy and decoding accuracy due to reliance on digital substitutes (Wajahat, 2024: Albrecht, 2024)

In fact, digital communication platforms and social media can make it more difficult to communicate through nonverbal cues like tone of voice and facial expressions. In this regard, Wajahat (2024) outlines the following effects of social media on nonverbal communication skills:

1. **Decreased Sensitivity to Nonverbal Cues:** Heavy usage, especially among younger people, is

linked to a diminished ability to recognize nonverbal signals in face-to-face interactions.

2. Changed Perception of Nonverbal Cues: Frequent exposure to edited and filtered images on social media can distort individuals' views of nonverbal signals. This distortion may lead to unrealistic standards or misunderstandings in real-world interactions.

3. Influence on Emotional Expression: Social media can affect how emotions are conveyed; that is, online interactions often lead to more superficial or exaggerated emotional expressions when compared to face-to-face communication.

Another way that media and technology have impacted nonverbal communication is through the use of video conferencing platforms. Video conferencing may enable face-to-face contact; however, it can also pose difficulties. On the other hand, camera conferencing can make it difficult to understand facial expressions and body language especially when there are technical challenges such as low camera quality or transmission delays.

Furthermore, the use of emojis and other digital symbols in digital communication has become a popular technique of conveying emotion and nonverbal clues. However, the interpretation of these symbols may vary based on the situation. This may result in misunderstandings.

According to research conducted by Maloney et al. (2020) on the effect of virtual reality on nonverbal communication, people may act differently in a virtual environment than they would in the actual world. As people might not express the same nonverbal clues in a virtual setting, this may have an impact on nonverbal communication as well the need to modify communication tactics. The significance of modifying communication tactics to take into account the influence of media and technology on nonverbal communication has been stressed by research. When practical, this entails using video conferencing, being succinct and precise when communicating via text, and being conscious of the nonverbal signs (Candrasari, 2021).

4.6 Related Studies and Research Gap

A number of prior studies have highlighted the importance of nonverbal communication across domains, from education to workplace interactions (Lawrence, 2017; Ruben et al., 2021).

In this aspect, Wajahat (2024) carried out a qualitative study (a case study) to examine how social media influences nonverbal cues and their effects on interpersonal relationships. The data collection for this study included examples from various social media platforms (YouTube, TikTok, WhatsApp, Reddit, LinkedIn, Zoom, and Pinterest). Findings showed that social platforms can hinder and enhance nonverbal communication. Moreover, they revealed that social media reduced access to many face-to-face contextual cues which increased the probability of misinterpretation and misunderstanding. In addition, the results indicated specific impacts on nonverbal skills and behavior such as reduced sensitivity to subtle nonverbal cues among heavy users and some changes in emotional expression online.

In their study, Samman et al. (2009) found that nonverbal signals carry a large proportion of interpersonal meaning. They also reported that while some nonverbal behaviors are universal, others are culture-specific. In addition, they argue that according to different contexts/cultures, a single nonverbal cue may have multiple meanings which may increase misinterpretation risk.

Moreover, Ruben et al. (2021) conducted a study to investigate whether everyday digital technology use alters people's ability to decode nonverbal behavior. Findings demonstrated that the impact of "technology use" varies according to how people use it; active/self-focused use of technology is typically associated with poor nonverbal decoding.

A similar study was carried out by Lawrence (2017) to investigate the effects of nonverbal communication across various contexts, such as religion, workplace interactions, friendships, and family relationships. Finding showed that nonverbal cues help establish connections in some contexts such as friendships and religious settings. However, findings also revealed that nonverbal communication styles can lead to misunderstandings, especially in multicultural environments.

In addition, Valentini et al. (2019) conducted a systematic review study to explore the significance of verbal and nonverbal communication in preschool education. After 36 international articles (a total of 4,811 participants were included) were reviewed, findings showed that nonverbal communication is crucial for effective interaction and learning in preschoolers. In addition, findings revealed that children use gestures and expressions to communicate emotions and ideas effectively.

Rosenberg and Sillince (2000) carried out a study to examine verbal and nonverbal communication in

a computer-mediated environment. They observed, examined, and analyzed verbal and nonverbal communication in a video-recorded meeting between two teams during a construction project. Findings demonstrated that nonverbal communication plays a crucial role in the dynamics of interactions, particularly in hybrid settings where face-to-face and mediated communication coexist. On the other hand, findings showed that the use of technology may hinder remote participants due to the technology's limitations on their visibility and voice.

Although these different studies have provided significant findings and contributed effectively to the existing literature, there are notable gaps that should be addressed. For instance, university students were totally neglected; more focus was placed on children and young learners. In addition, there is a notable shortage in studies with regard to nonverbal communication within Libyan contexts in general, particularly in Libyan higher education settings. In addition, while previous studies relied mainly on one recourse of data (quantitative or qualitative data), the current study addresses these gaps by employing a mixed-method approach to collect and analyze data in order to obtain more reliable data about the topic under investigation.

5. Methodology

The current study concentrated on the impact of media and technology on nonverbal communication. In consideration of the exploratory and empirical nature of the research, a mixed-method approach was adopted, combining quantitative (survey) and qualitative (semi structured interview) to data collection and analysis. This methodological choice allowed for triangulation of findings and therefore provided a more comprehensive understanding of the phenomenon under investigation.

5.1. Participants

The sample for this study consisted of twenty Libyan postgraduate students (5 males, 15 females) enrolled in the Master's program in Applied Linguistics at the Faculty of Languages, University of Benghazi, during the academic year 2025/2026. Participants, who were selected randomly from the cohort, shared similar cultural and educational backgrounds. Their ages ranged from 28 to 38 years, ensuring representation of early to mid-career adult learners. Importantly, all participants reported regular use of digital technologies as a part of their daily communication practices, making them well-suited as a sample to provide relevant insights into the study's focus.

5.2. Data Collection

The study was conducted in the academic year 2025–2026 at the University of Benghazi. It is crucial to note that participants gave their informed consent for the study before the actual data collection procedures began. The researchers then provided the participants with a brief explanation of the purpose and nature of the study before distributing the questionnaire. Following the completion of the questionnaire, informed consent was reaffirmed at the start of the interview and explained how the participants' contribution would help achieve the study's objectives.

5.2.1. Questionnaire

The questionnaire combined both closed and open-ended items and was designed to capture multiple dimensions of respondents' communication practices. Specifically, it measured frequency and channels of digital communication, and assessed the perceived importance and use of nonverbal cues such as eye contact, facial expressions, tone, and gestures. In addition, it investigated the effectiveness of substitutes such as emojis, video conferencing, and VR. Beyond these measures, the questionnaire explored participants' experiences of misunderstanding, adaptive strategies, cross-cultural differences, feedback on nonverbal behavior, and expectations about how technology will shape nonverbal communication in the future. The instrument was divided into two sections. The first section consisted of structured, closed-ended questions with predetermined response options, enabling quantifiable analysis of communication patterns. The second part included open-ended questions, allowing participants to reflect more deeply on their personal experiences, interpretations, and reactions. This dual structure ensured both breath and depth of data collection, aligning with the study's mixed-method design.

5.2.2. Interview

Semi-structured interviews were employed because they enabled exploration of participants' lived experiences and provided rich, contextual explanations that clarified survey patterns and revealed why and how digital media alter nonverbal behavior. The interview protocol consisted of five guiding questions. These examined participants' channel choices (face-to-face, video, text, social media, VR) and how those choices influenced the nonverbal cues they noticed,

produced, or lost. The interview questions also explored instances of misunderstanding experienced by the participants, compensation strategies (e.g., emojis, wording, voice/video use), changes in sensitivity to in-person cues after heavy digital use, and the role of cultural differences in interpreting nonverbal signals. This design allowed for flexibility in probing individual experiences while maintaining consistency across participants, thereby ensuring both depth and comparability of responses.

5.3. Data Analysis

Data analysis is a fundamental component for any academic study as it leads to the final results which can be used later as a base to make significant decisions. In this aspect, Baker (2015) asserts that students, teachers, and administrators can all benefit from the analysis of educational data since it can help them comprehend the learning process and collaborate to make it better. Therefore, data analysis was conducted in line with the study's mixed-methods design.

The survey data were analyzed quantitatively using SPSS to identify patterns in participant's frequency of digital communication, preferred channels, as well as perceived importance of nonverbal communication. Using descriptive statistics, frequencies and percentages were calculated to provide a clear overview of trends.

The interview data were analyzed qualitatively through inductive thematic analysis following the six-phase procedure outlined by Braun and Clarke (2006): data familiarisation, initial code generation, theme search, theme review, theme definition, and final write-up. Coding was carried out in NVivo. To enhance reliability, two researchers independently coded a 25% subset of the transcripts. Discrepancies were resolved through discussion until consensus was reached, and the agreed codebook was then applied to the full dataset.

The trustworthiness of the qualitative analysis was ensured following the four criteria proposed by Lincoln and Guba (1985): credibility was established through member checking, in which a summary of preliminary themes was returned to five participants for discussion and confirmation; transferability through detailed description of participants and context; dependability through an audit trail documenting analytical decisions; and confirmability through reflexive memos kept by both researchers throughout coding.

The mixed-methods design followed a convergent parallel structure (Creswell & Plano Clark, 2018): quantitative and qualitative strands were collected and analysed independently and then integrated at the interpretation stage, with each strand used to corroborate, elaborate, or qualify the other.

Responses were transcribed, read repeatedly, and then coded to identify recurring themes related to the topic under investigation. Codes were then grouped into broader categories, allowing for the development of themes that clarified and expanded upon survey findings. To do so, the researcher adopted one of the computer-assisted qualitative data analysis software programs, namely, NVivo.

Finally, the results from both datasets were triangulated to enhance validity and reliability. This integration of quantitative and qualitative evidence offered a comprehensive understanding of how media and technology influence nonverbal communication among Libyan postgraduate students.

Ethical approval for the study was obtained from the Faculty of Languages at the University of Benghazi. All participants provided written informed consent, were informed of their right to withdraw at any point without consequence, and were assured that all data would be kept anonymous and stored securely on a password-protected device accessible only to the researchers. Pseudonyms were used throughout the reporting of qualitative findings.

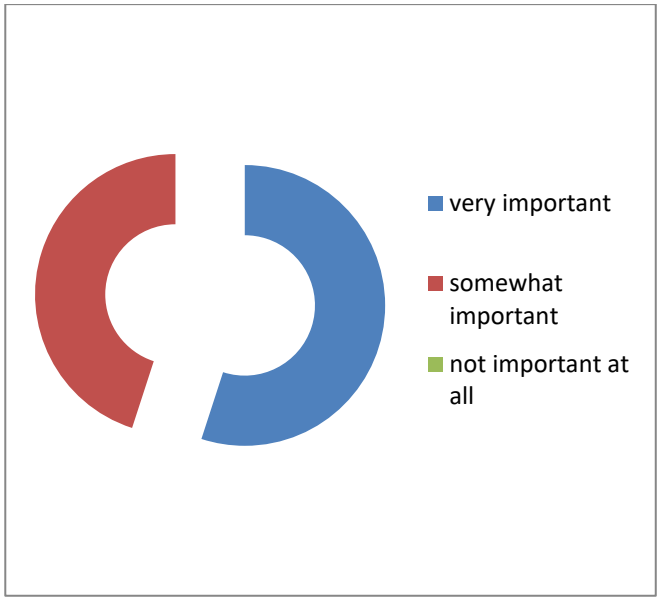
5.3.1. Questionnaire

In the current study the survey was divided into two sections, the first section questions were accompanied with set of expected answers, the second section gave more room to elaborate each answer.

Q1. **How important do you believe nonverbal communication is in everyday interactions?**

The questionnaire begun by asking about how fundamental the nonverbal communication is to every person in everyday interactions. The majority declared that it is very important by 55% when the rest declared that it is somewhat important by 45%. However, no one believed that nonverbal communication was insignificant in day-to-day interactions.

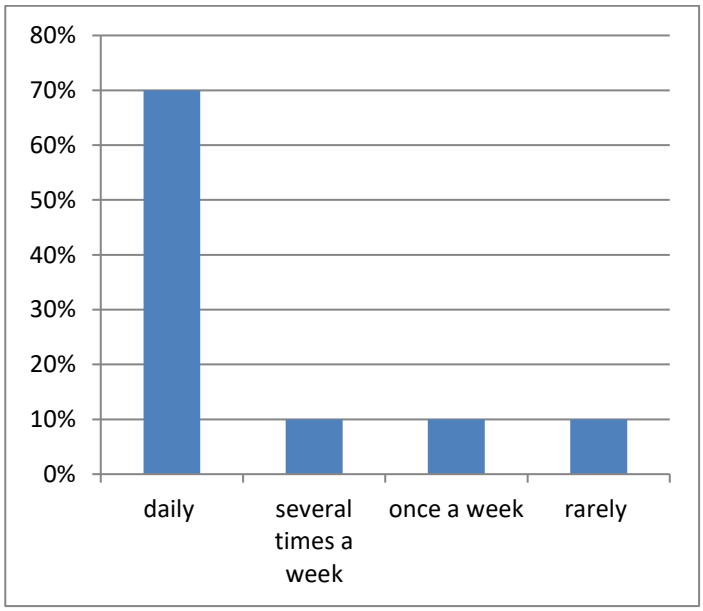
Figure 1 Perceived Importance of Nonverbal Communication in Everyday Interactions



Q2. How often do you communicate with others through digital platforms (text-based communication, video conferencing, social media, etc.)?

When the participants were asked about how often they use digital platforms and social media to communicate with others, roughly 70% of the participants reported that they do them on a daily basis. Followed by 10% for each of the rest of the answers.

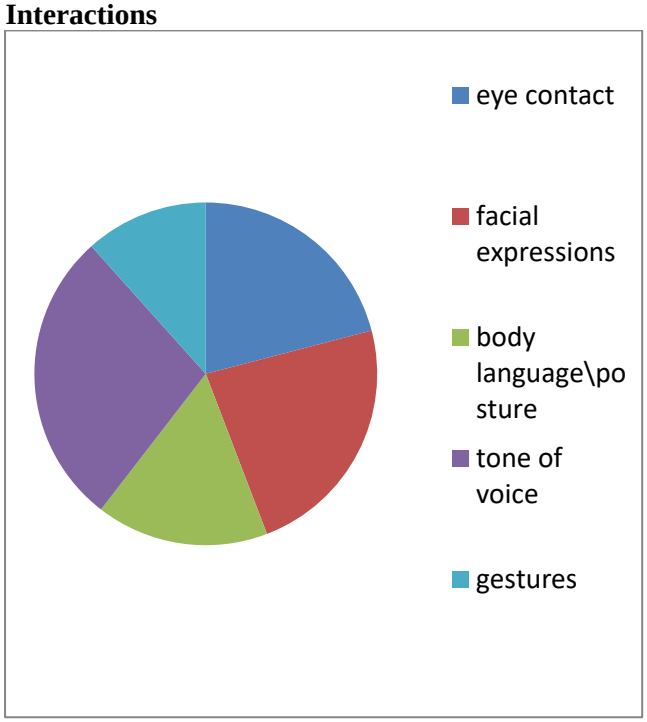
Figure 2 Frequency of Digital Platform Use for Communication



Q3. In what ways do you use nonverbal communication in your own interactions with others?

Participants were asked about the approaches through which they use nonverbal communication. Participants responses were as follows: 60% was the largest percentage, which indicates that tone of voice can perfectly give a nonverbal message; body language/posture comes in at 35%, eye contact at 45%, facial expressions at 50%, and gestures at 25%.

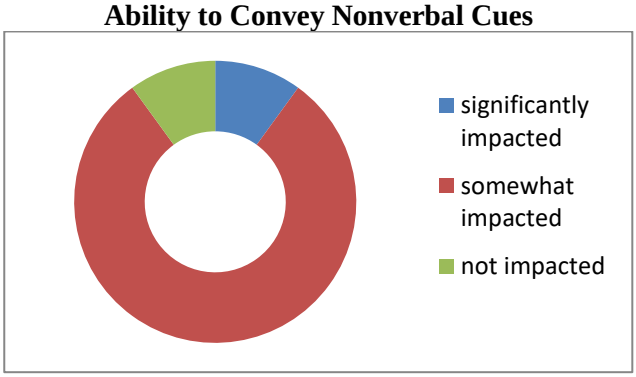
Figure 3 Types of Nonverbal Cues Used in Interactions



Q4. In what ways do you feel that the use of digital communication platforms has impacted your ability to convey nonverbal cues, such as facial expressions and tone of voice?

The questionnaire discussed how individuals thought using digital communication platforms had impacted their ability to convey nonverbal cues. Roughly 80% stated that it has affected their use of nonverbal communication in some way. 10% of respondents indicated it had a significant influence on their nonverbal cues, while 10% said it had no effect at all.

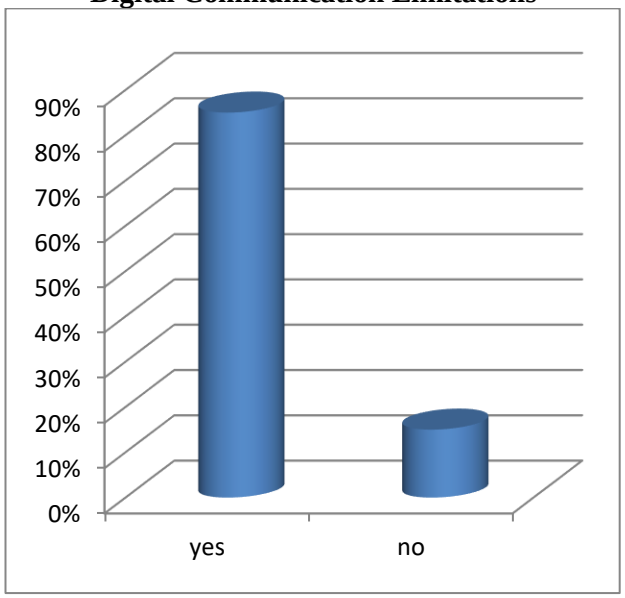
Figure 4 Perceived Impact of Digital Platforms on Ability to Convey Nonverbal Cues



Q5. Have you ever experienced misunderstandings or misinterpretations due to the limitations of digital communication?

Digital communications sometimes have limitations that could affect the ability to convey or disregard the meaning of some nonverbal cues. As shown in Figure 5, 85% of the participants have experienced misunderstandings or misinterpretations due to the limitations of digital communication.

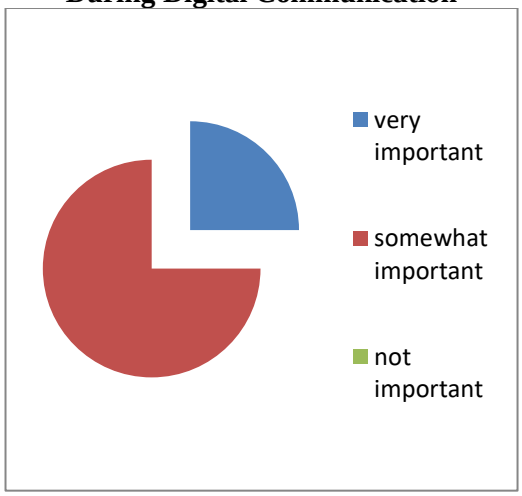
Figure 5 Incidence of Misunderstandings Due to Digital Communication Limitations



Q6. How important do you feel it is to be aware of your own nonverbal cues when communicating through digital platforms?

Communicating on digital platforms requires awareness of each person's nonverbal cues. Roughly 15% of the participants confirmed the essentiality of such awareness, whereas 75% asserted that it is important.

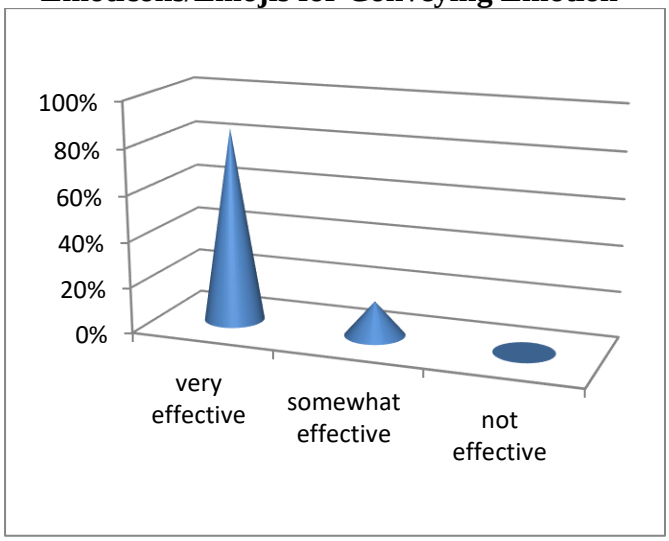
Figure 6 Awareness of One's Own Nonverbal Cues During Digital Communication



Q7. Have you ever used emoticons or emojis to convey emotion or nonverbal cues in digital communication? If so, how effective do you feel this was?

About 85% of the responses confirmed the efficiency of including emojis and emoticons in their communication.

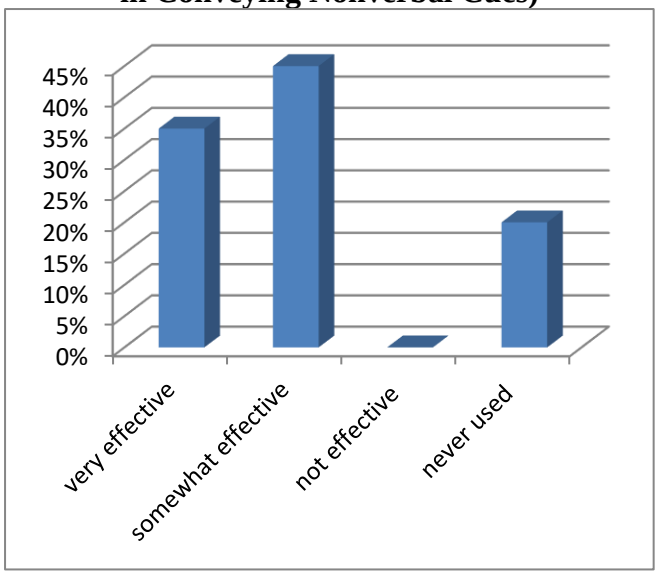
Figure 7 Perceived Effectiveness of Emoticons/Emojis for Conveying Emotion



Q8. Have you ever used video conferencing platforms to communicate with others? If so, how effective do you feel the platform was in conveying nonverbal cues?

As illustrated in Figure 8, roughly 20% of participants never used video conferencing. On the other hand, 35% claim it is very useful, and 45% claim it is useful to some extent.

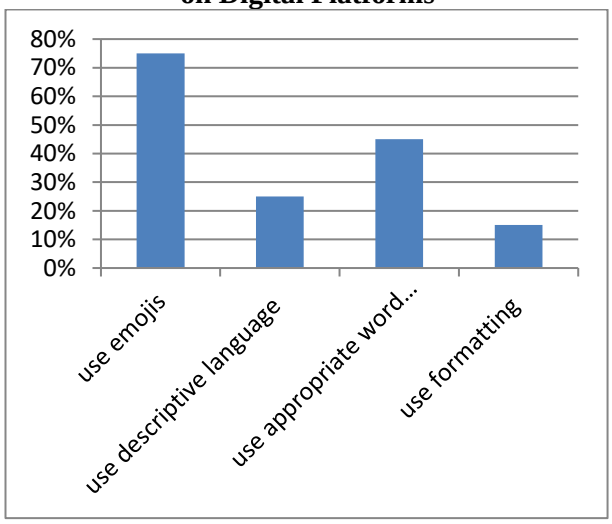
Figure 8: (Effectiveness of Video Conferencing in Conveying Nonverbal Cues)



Q9. How do you adapt your communication strategies when using digital communication platforms to ensure that nonverbal cues are conveyed effectively?

The participants were asked about the means by which they adjust their communication mechanisms to ensure that nonverbal cues are successfully conveyed. 75% of the participants indicated that emojis are the easiest simple way to do so. 45% indicated that using an appropriate word choice results in better understanding of nonverbal cues. 25% indicated that using descriptive language delivers nonverbal cues. And lastly, 15% indicates formatting clears nonverbal cues.

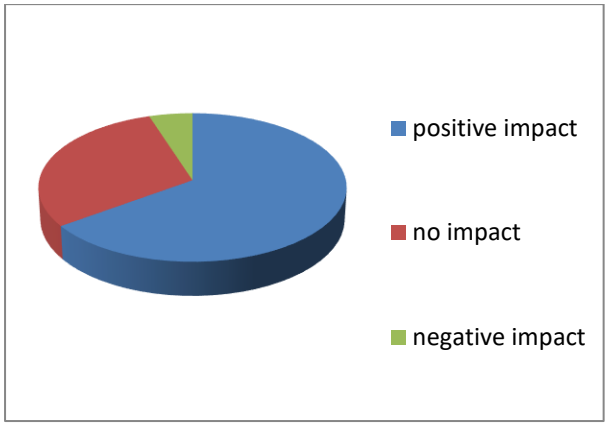
Figure 9 Strategies Used to Convey Nonverbal Cues on Digital Platforms



Q10. Have you ever received feedback on your own nonverbal cues during digital communication? If so, how did this impact your communication style?

While the previous questions discussed participants' points of view, this question focused on other people's reactions to the participants' use of nonverbal clues. Positive feedback was reported by 65% of respondents. 30% reported no feedback, while 5% reported that they received negative feedback.

Figure 10 Feedback Received on Personal Nonverbal Cues During Digital Communication



5.3.2 Interview

After raw data is analyzed systematically, researchers can uncover patterns, trends, test hypotheses, and make informed decisions. Flick (2020) claims that qualitative data analysis aims to describe a phenomenon such as the experiences of a specific individual or group, or to compare different cases among them. Accordingly, thematic analysis was employed to identify common themes and patterns within the data collected from the semi- structured interview. The following is an analysis of participants' responses for each interview question.

Q1. Which communication channels do you use most (face-to-face, video calls, text, social media, VR) and how do these choices affect the nonverbal cues you attend to or produce?

The majority of the participants used a variety of different channels. WhatsApp/text were the most used for quick exchanges, Zoom/Teams for classes, and occasional face-to-face meetings. In addition, many report that text messages reduce visible cues, so they rely on punctuation, emojis, and phrasing; video allows some facial/tone cues but still feels constrained. On the other hand, a few preferred in-person communication when nuance matters (e.g., feedback, conflict).

Q2. Can you describe a specific incident when a nonverbal cue was misunderstood in a digital interaction and explain what you think caused the misunderstanding?

In light of the second question, the common incidents that were reported by the participants included jokes or sarcasm taken literally in group chats, blunt academic feedback misread without tone, and emoji misinterpretation across cultures. When misunderstandings occurred, participants often clarified via voice call or added explanatory follow-up messages. On the other hand, the typical causes of misunderstanding reported by the

participants involved the absence of vocal/paralinguistic signals and a brief messaging culture.

Q3. How do you intentionally adapt your nonverbal expression online (e.g., tone, emojis, wording, formatting, video framing) to convey emotion or clarity, and which adaptations do you find most effective?

The frequent strategies employed by the participants ranged from the use of emojis/GIFs to signal tone to explicit qualifiers ("just kidding" and "to be clear"), lengthened messages to provide context, and voice notes when nuance is important. On the other hand, emojis and voice notes were rated as the most effective for quick emotional cues.

Q4. In your experience, how has frequent use of digital media changed your sensitivity to nonverbal cues during face-to-face interactions?

Participants reported mixed effects; some participants indicated that the use of digital media reduced their immediate sensitivity to facial or body cues (especially younger participants). Others reported increased awareness of micro-expressions in face-to-face meetings. In addition, many participants stated that they now check for nonverbal signals more, especially in face-to-face interactions.

Q5. How do cultural differences influence the interpretation of nonverbal cues in digital communication, and can you give an example where cultural norms affected understanding?

Participants stated that cultural differences influence nonverbal cues to some extent. Cultural mismatches in emoji interpretation and norms for directness and differences in acceptable eye contact on video vs. face-to-face were noted. For example, an emoji that seems friendly in one culture is read as sarcastic by another. Accordingly, some tend to use more explicit language or ask follow-up questions when interacting across cultures.

6. Discussion

In recent years, the impact of media and technology on nonverbal communication has become crucial to fully understand modern interpersonal interactions. This study aimed to explore how digital communication influences individuals' sensitivity to nonverbal cues, as well as the perception and expression of emotions in both digital and face-to-face contexts. More specifically, it set out to examine how media and technology shape nonverbal communication among Libyan postgraduate students, working from a tripartite theoretical framework combining Media Richness Theory, the Cues-Filtered-Out perspective, and Social Information Processing Theory. The findings do not support any single one of these theoretical perspectives; on the contrary, they suggest that all three are simultaneously evident in participants' communicative lives, operating on different time-scales and in response to different communicative tasks and contexts.

6.1 Channel Leanness and the Persistence of Misunderstanding

The strongest quantitative result is that 85% of participants reported having experienced misunderstandings due to the limitations of digital communication; this provides clear empirical support for the predictions of Media Richness Theory and the Cues-Filtered-Out perspective. When channels take away facial expression, vocal tone, and proxemic information, the interpretive load on the remaining verbal content increases, and ambiguity becomes inevitably more frequent. Interview accounts indicated this ambiguity with notable precision: sarcasm and humour misread in group chats, blunt academic feedback received as hostile in the absence of mitigating tone, and emoji misinterpretation across cultural lines. These are precisely the affective and relational layers that the leanest channels (SMS, WhatsApp text) cannot transmit, and they are precisely the layers that face-to-face interaction handles automatically through paralanguage and kinesics. The finding agree with Wajahat (2024) and Rosenberg and Sillince (2000) by demonstrating that channel-induced ambiguity is not a marginal experience but a very common one in this sample.

6.2 Compensation, Adaptation, and the SIP Account

However, a cues-filtered-out reading alone cannot account for the data. As a matter of fact, participants did not simply suffer the loss of nonverbal cues; they actively found functional alternatives within the channels available to them. When one considers the 75% who reported using emojis as their primary adaptive strategy, the 45% who reported deliberate word choice, the use of voice notes for nuanced content, and the use of explicit verbal qualifiers, it becomes clear that they together constitute a clear demonstration of the adaptive process Walther (1992) describes. Participants were, in effect, re-encoding kinesic

and paralinguistic information into orthographic and graphic form. The qualitative material is particularly revealing here: several participants described switching channels when a message proved unmanageable in text and moving to a voice call to repair a misunderstanding, or reserving in-person meetings for "feedback and conflict." Channel selection itself emerges as an adaptive nonverbal act, in line with recent extensions of SIP to multimodal environments (Walther & Parks, 2023).

Importantly, however, participants also reported the limits of compensation. They observed that voice notes were rated highly effective; emojis were rated effective for "quick emotional cues" but inadequate for nuance; text alone was widely viewed as risky for anything beyond informational exchange. This perception of graduated, substitute richness aligns with Media Richness Theory's prediction that users intuitively match channel to task: routine exchanges tolerate lean channels, but socio-emotionally complex exchanges drive users either to richer channels or to deeper compensatory strategies. Therefore, the findings suggest that the cues-filtered-out and SIP frameworks are not competitors but describe different phases of the same strategy, an adaptive process where the initial loss of cues gives way to the subsequent reconstruction of functional equivalents.

6.3 The Cultural Layer: Emoji Polysemy and Arabic-Speaking Contexts

A finding less commented on in the existing literature concerns the role of cultural context in shaping digital nonverbal communication. Participants repeatedly identified emojis as objects of cross-cultural misreading — "an emoji that seems friendly in one culture is read as sarcastic by another." This observation is significant because it makes problematic the often-implicit assumption in CMC research that graphic substitutes function as a kind of cultural lingua franca. Actually, they seem not to. Emojis are polysemic, and their conventional meanings emerge within speech communities, much as gesture conventions do (Matsumoto, 2006). Besides, for Arabic-speaking users navigating digital spaces dominated by anglophone communicative conventions, this polysemy adds a layer of interpretive load that English-speaking users may not encounter. This finding extends Adair et al. (2024) on virtual intercultural communication by showing that the locus of cross-cultural difficulty in CMC has shifted partly from the verbal-pragmatic level to the graphic-substitute level — a domain that to date has received limited empirical attention in non-Western higher-education contexts. The Libyan setting of this study therefore contributes a perspective largely absent from the existing literature, which has been disproportionately based on North American and East Asian samples.

6.4 The Bidirectional Effect on Face-to-Face Sensitivity

The most theoretically interesting finding may be the apparent contradiction in participants' accounts of how digital use has affected their face-to-face sensitivity. Some reported reduced sensitivity to facial and body cues, a finding consistent with the concerns raised by Wajahat (2024) and Ruben et al. (2021), while others referred heightened attention to micro-expressions and a habit of "checking" nonverbal signals more deliberately than before. Rather than treating these as contradicting findings, they might represent as evidence that heavy digital use restructures, rather than uniformly degrades, nonverbal attention. For users whose digital communication is largely passive or text-only, loss of decoding skill (Ruben et al., 2021) is plausible. For those users who routinely fluctuate between text, video, and face-to-face, as most participants in this study, a more deliberate, meta-aware mode of nonverbal monitoring may develop, in which face-to-face cues are no longer processed without consideration, but are actively scanned. This second pattern has not, to our knowledge, been systematically described in the CMC literature, and it warrants further investigation.

In view of these considerations, the findings suggest that the relationship between media and nonverbal communication is neither one of replacement nor of simple loss, but of redistribution: nonverbal functions are being distributed across a wider range of semiotic resources (text, emoji, voice note, video, in-person meeting) that users select strategically. The competence required of communicators in the digital era is therefore not only the capacity to read embodied cues but also the capacity to select channels appropriately and to encode and decode their graphic and typographic substitutes. This is in itself a competence that is culturally variable.

In the light of the first question of the current study, which aimed to investigate the relationship between media and technology use and individuals' sensitivity to nonverbal cues in

interpersonal communication, findings reveal that technology significantly affects the landscape of nonverbal communication. In this regard, the majority of participants reported a reduced sensitivity to nonverbal cues during in-person interactions. This is attributed to their reliance on digital platforms for communication. In fact, this result is consistent with previous studies (e.g. Maloney et al., 2020; Gut et al., 2017; Lawrence, 2017) which suggest that online interactions may lead to misinterpretations of body language, tone, and overall emotional context. Moreover, many participants reported instances of sarcasm or humor that were not effectively conveyed online. This result is compatible with existing literature (e.g. Rosenberg and Sillince, 2000; Lawrence, 2017) which suggests that nonverbal communication styles may lead to misunderstandings, especially in multicultural environments.

The second question of the present study aimed explore how emotional expression differs between digital and traditional communication formats and how these differences shape interpersonal relationships. Accordingly, participants stated they frequently use emojis, gifs, and other digital symbols in order to compensate the absence of physical nonverbal cues. While these substitutes offer a way to convey emotion, they may also lead to superficial interactions. For instance, text-only communication is more prone to misunderstandings (reported by ≈85% of participants), especially for sarcasm or subtle emotion. This finding is in line with previous studies (e.g. Maloney et al., 2020; Derks et al., 2023; Walther et al., 2023; Wajahat, 2024) which found out that digital expression relies on symbolic substitutes (emojis, GIFs, emoticons, punctuation, voice notes) that convey affect rapidly but with reduced nuance.

7. Limitations and Future Research

Like all research, this study has certain limitations, related to methodology, context, timeframe, and participant characteristics. The findings should therefore be interpreted with caution. In fact, this study was an attempt to open the door for investigating nonverbal communication which has neglected for years. However, this study should be followed by other studies to explore different aspects of nonverbal communication.

Moreover, this study was conducted on a sample of only one university (University of Benghazi), which may not reflect the full picture in the rest of the Libyan universities and may affect the accuracy of the generalization. In this aspect, future research should use larger, cross-cultural samples with objective behavioural measures to clarify causal pathways and inform practical guidance for effective mediated and hybrid communication.

8. Conclusion

This mixed-methods study of Libyan postgraduate students shows that media and technology have reshaped, rather than simply replaced, nonverbal communication. While participants continue to value face-to-face nonverbal cues, they routinely adapt to the reduced cues of many digital channels (emojis, GIFs, voice notes, explicit wording). On the other hand, based on the findings of the current study, it can be argued that technology can both hinder and support nonverbal expression and perception depending on channel choice, user practices, and cultural context. Accordingly, this study emphasizes the necessity of understanding the effects of media and technology on nonverbal communication. In addition, in order to avoid misunderstandings, particularly in multicultural interactions, individuals may need to develop cultural competence to navigate these interactions effectively.

References

- Abercrombie, M. L. J. (1972). Parent-staff communication in a children's unit. Section of Paediatrics, *Sage Publishing*, *65*, 335-336. Retrieved from: http://journals.sagepub.com/doi/pdf/10.1177/003591577206500407
- Adair, W. L., Buchan, N. R., Chen, X. P., & Liu, L. A. (2024). *What's not being said when communications are virtual?* Springer Series in Emerging Cultural Perspectives, 123–137.
- Albrecht, S. (2024). The impact of computer-mediated communication on organizational culture. *Journal of Organizational Culture, Communications and Conflict*, *28*(3), 1–3.
- Amaghlobeli, N. (2012). Linguistic features of typographic emoticons in SMS discourse. *Theory and practice in language studies*, *2*(2), 348.
- Baker, R. (2015). *Teachers College*. New York: Columbia University Press.
- Baumgardner, D. J. (2017). Every word, every gesture. *Patient-centered research and review*,*4*(3), 136-138. doi: 10.17294/2330.0698.1258

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.
- Burgoon, J., Buller, D., & WG, W. (1994). *Nonverbal communication: The unspoken dialogue*. Greyden Press.
- Burgoon, J. K., & Bacue, A. E. (2003). Nonverbal communication skills. In J. O. Greene & B. R. Burleson (Eds.), *The handbook of communication and social interaction skills (pp. 179–219)*. Mahwah, NJ: Erlbaum.
- Candrasari, Y. (2021). Nonverbal Communication Reconstruction on Facebook. *Jurnal The Messenger, 13*(1), 94-107.
- Cesario, J., & Higgins, E. T. (2008). Making message recipients "feel right" how nonverbal cues can increase persuasion. *Psychological science, 19*(5), 415-420.
- Chiang, C., & Gomez-Zara, D. (2024). The evolution of emojis for sharing emotions: A systematic review of HCI literature. *arXiv:2409.17322*.
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage.
- Culnan, M. J., & Markus, M. L. (1987). Information technologies. In F. M. Jablin et al. (Eds.), *Handbook of organizational communication* (pp. 420–443). Sage.
- Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science, 32*(5), 554–571.
- Derks, D., Fischer, A. H., & Bos, A. E. R. (2023). *The role of emotion in computer-mediated communication: A review. Computers in Human Behavior, 146*, 107746.
- Eaves, M., & Leathers, D. G. (2017). *Successful nonverbal communication: Principles and applications.* Routledge.
- Flick, U. (2020). *Introducing research methodology: Thinking your way through your research project*. SAGE.
- Gabor, D., Baritz, M., & Repanovici, A. (2015). The study of stimulated visual behavior related to nonverbal communication. *Procedia Technology, 19*,1102-1108, doi:10.1016/j.protcy.2015.02.157
- Gut, A., Wilczewski, M., & Gorbaniuk, O. (2017). Cultural differences, stereotypes and communication needs in intercultural communication in a global multicultural environment. *Intercultural communications, 43* (1), issn: 1404-1634.
- Harrison, R. P. (1973). Nonverbal communication. *In I. S. Pool, W. Schramm, N. Maccoby, F. Fry, E. Parker, & J. L. Fern (Eds.), Handbook of communication* (pp. 93–115). Chicago: Rand McNally.
- Ismail, N. N. A. S., Mageswaran, N., Bujang, S. M., & Awang Besar, M. N. (2024). Beyond words: Analyzing non-verbal communication techniques in a medical communication skills course via synchronous online platforms. *Frontiers in Medicine, 11*, 1375982.
- Kiesler, S., Siegel, J., & McGuire, T. W. (1984). Social psychological aspects of computer-mediated communication. *American Psychologist, 39*(10), 1123–1134.
- Kumari, R., & Ganagwar, R. (2018). A critical study of digital nonverbal communication in interpersonal and group communication: In *context of social media. International Journal of Communication and Media Studies, 8*(4), 1-12.
- Lawrence, S., (2017). *The Power of Nonverbal Communication.* Bachelor Thesis. USA: Murray State University (Accessed 13 March 2026) https://digitalcommons.murraystate.edu/bis437/79.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.
- Maloney, D., Freeman, G., & Wohn, D. Y. (2020). " Talking without a Voice" Understanding Non-verbal Communication in Social Virtual Reality. *Proceedings of the ACM on Human-Computer Interaction, 4*(CSCW2), 1-25.
- Mandal, F. B. (2014). Nonverbal communication in humans. *Journal of Human behavior in the Social Environment, 24*, 417-421. doi: 10.1080.10911359.2013.831288
- Matsumoto, D., Frank, M. G., & Hwang, H. S. (2013). Reading people: Introduction to the world of nonverbal behavior. In *D. Matsumoto, M. G. Frank, & H. S. Hwang (Eds.), Nonverbal communication: Science and application* (pp. 3–14). Sage Publication.
- Matsumoto, D., & Hwang, H. S. (2013). Facial expressions. In *D. Matsumoto, M. G. Frank, & H. S. Hwang (Eds.), Nonverbal communication: Science and applications* (pp. 15-52). Sage Publication.
- Matsumoto, D. (2006). Culture and nonverbal behavior. *The SAGE handbook of nonverbal communication*, 219-235.
- Matsumoto, D. (2000). *Culture and psychology: People around the world (2nd ed.).* Belmont, CA: Wadsworth Publishing Company.

- McKenna, K. Y. A., & Bargh, J. A. (2000). Plan 9 from cyberspace: The implications of the Internet for personality and social psychology. *Personality and Social Psychology Review, 4*, 57–75.
- Montepare, J. M. (2014). Nonverbal behavior in the digital age: Explorations in Internet social communication. *Journal of Nonverbal Behavior, 38,* 409-411.
- Rosenberg, D., & Sillince, J. A. (2000). Verbal and nonverbal communication in computer mediated settings. *International Journal of Artificial Intelligence in Education, 11,* 299-319.
- Ruben, M. A., Stosic, M. D., Correale, J., & Blanch-Hartigan, D. (2021). Is technology enhancing or hindering interpersonal communication? A framework and preliminary results to examine the relationship between technology use and nonverbal decoding skill. *Frontiers in psychology, 11*, 611670.
- Samman, S. N., Moshell, M., Clark, B., & Brathwaite, C. (2009). Learning to decode nonverbal cues in cross-cultural interactions.
- Tanenbaum, J., El-Nasr, M. S., & Nixon, M. (2014). *Nonverbal communication in virtual worlds*. ETC Press Pittsburgh, PA.
- Valentini, M., Mancini, M., Raiola, G., & Federici, A. (2019). Digital and non-verbal communication in preschool: A systematic review. *Journal of Human Sport and Exercise, 14*(4proc), S997-S1016. doi: https://doi.org/10.14198/jhse.2019.14.Proc4.62
- Ventrella, J. (2011). *Virtual body language: The history and future of avatars: How nonverbal expression is evolving on the internet*. Lulu. com.
- Wahyuni, A. (2018). The power of verbal and nonverbal communication in learning. In *1st International Conference on Intellectuals' Global Responsibility (ICIGR 2017)* (pp. 80-83). Atlantis Press.
- Wajahat, A. (2024). Social media and its impact on non-verbal communication. *International Journal for Multidisciplinary Research, 6*(3), 1-10.
- Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research, 19*(1), 52–90.
- Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research, 23*(1), 3–43.
- Walther, J. B. (2011). Theories of computer-mediated communication and interpersonal relations. In M. L. Knapp & J. A. Daly (Eds.), *The SAGE handbook of interpersonal communication* (4th ed., pp. 443–479). Sage.
- Walther, J. B., & Parks, M. R. (2023). *Cues filtered in, cues filtered out: Social information processing theory and computer-mediated communication. Journal of Communication, 73*(4), 567–589.
- Woolfolk, A. E., Abrams, L. M., Abrams, D. B., & Wilson, G. T. (1979). Effects of alcohol on the nonverbal communication of anxiety: The impact of beliefs on nonverbal behavior. *Environmental psychology and nonverbal behavior, 3,* 205-218.